

HYDE (JOHN)
*Dr. John I. Billings, U.S.A. with the
writer's regards.*

GEOGRAPHICAL CONCENTRATION,

... AN ...

Historic Feature of
American Agriculture.

BY

JOHN HYDE,

Expert Special Agent, Statistics of Agriculture, Eleventh U. S. Census, Fellow of
the Royal Statistical Society of London and of the American Statistical Association,
Member of the Council of the National Geographic Society,
Honorary Corresponding Member of the State Historical
Society of Wisconsin and of the Society of Alaskan
Natural History and Ethnology, etc.

PREPARED, BY INVITATION, FOR THE
FIFTH BIENNIAL SESSION
OF THE
INTERNATIONAL STATISTICAL INSTITUTE,
CHICAGO, 1893.

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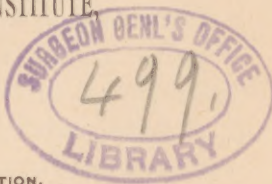
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GEOGRAPHICAL CONCENTRATION:

An Historic Feature of American Agriculture.

In that marvelous series of pictures illustrative of the national growth, geographical distribution, and material progress of the people of the United States, presented to the country and the world in the reports of successive decennial censuses, the most conspicuous feature is agriculture, the central figure the husbandman. Whether considered with regard to the number of persons to whom, directly or indirectly, it gives employment, to its close relation to the social system of the country, to the volume and value of its products or to the relation of those products to our trade with other nations, American agriculture is a subject of large dimensions. No single event in the history of the Republic nor any of those triumphs of inventive genius and constructive skill which mark our onward march as a people; not even that mighty westward movement of population which, long before it had attained the volume we have witnessed in our own day, excited the astonishment of the civilized world and seemed to the philosophic historian of Europe to have all the grandeur and solemnity of a providential event,—none of them, to my mind, possesses greater significance or is more beneficent and far-reaching, at least in its direct results, than are the transformation, on so unexampled a scale, of forest and prairie into smiling cornfields and fruitful orchards and that prodigious annual ingathering of the fruits of the earth

which has made this country facile princeps among the nations of the world.

The agriculture of a country, the capabilities of which are so enormous that its annual production of a single cereal is measured by billions of bushels, and which in the ten years ending June 30, 1890, sold \$5,639,203,272 worth of its agricultural products to other nations after supplying the requirements of its own large population; a country whose climatic range extends from the sub-Arctic to the sub-Tropic, modified by the greatest lake system and two of the greatest mountain ranges in the world, and with a mean annual rainfall varying from 1.85 inches in its most arid region to 105.25 inches in its region of greatest precipitation; a country occupied by so composite a people that in three of the greatest agricultural states in the Union, including the state that stands first in the production of wheat, the foreign-born element in the agricultural population outnumbers the native, while in another great agricultural state there are 136 negroes to every 100 whites,—the agriculture of such a country necessarily affords an interesting and instructive field of investigation, from whatever point of view it is considered. Among its various features of interest is that tendency to geographical concentration which has always characterized the cultivation of many of the principal products of the soil. In speaking of geographical concentration as an historic feature of American agriculture I do not refer to those limitations of the area of production which are imposed by the conditions of climate, as in the case of the sub-tropical products of the states bordering on the Gulf of Mexico, but only to products that have a wide climatic range, such as maize, wheat, oats, barley, rye, tobacco, flax, hemp, hops, etc., the cultivation of which in the United States has always been distinguished for its geographical concentration.

Indian corn, or maize, is cultivated in this country from the most easterly county in Maine to the most westerly in the state of Washington and from the valley of the Red River of the North to the confines of the Everglades of Florida. Its area of production is, in fact, more generally distributed than that of any other product except grass, and yet at no agricultural census ever taken has there been less than 38.57 per cent of the total crop of the country produced in what have been for the time being the four leading corn-producing states, while the percentage has been as high as 52.36 and was 50.80 as recently as 1889. The states that stood first, second, and third in the scale of production in 1839 stood tenth, eighth, and seventeenth in rank, respectively, in 1889, notwithstanding that their own aggregate production had increased 41.72 per cent. On so vast a scale is corn now cultivated in a group of states in the Mississippi and Missouri valleys that the combined production of Iowa, Illinois, and Kansas in 1889 exceeded by over 100,000,000 bushels the total corn crop of the country but twenty years before. It was the year 1879, however, that witnessed, so far as can be determined from official statistics, the high-water mark of the tendency to concentration in the cultivation of this favorite product, the production of the states of Illinois and Iowa in that year aggregating the enormous total of 600,816,728 bushels, or 34.23 per cent of the entire crop of the country. During the following decade there was some tendency toward decentralization, but yet the census of 1890 found over one-half of the total corn crop of the previous year to have been produced in four states containing less than one-tenth of the entire area of the country, notwithstanding that a production of at least one-tenth of a bushel to every acre of land surface and of at least five bushels per capita of population extended all the way from the St. Lawrence River to the Gulf of Mexico and westward to

within sight of the Rocky Mountains.

In the case of wheat the area of principal production has undergone great changes during the last half-century. While its center moved steadily westward for forty years, as was the case also with that of the production of corn, oats, and barley, the result of that remarkable redistribution of the productive area which occurred during the closing years of the decade ending with 1889 was that the two states of principal production were as widely separated geographically as they are in their physical conditions, Minnesota leading with 11.17 per cent of the total and California standing second with 8.73 per cent, while the addition of the crops of Illinois and Indiana raised the proportion to 35.85 per cent. Although this is a smaller percentage of the total crop of the country than was contributed by the four leading wheat-producing states at any previous agricultural census, it is a significant fact that more than one-third of the total production of the principal bread-plant had to be credited to so limited an area. But whatever the changes in the location of the wheat-producing area there has always been a more or less marked geographical concentration. In 1839 61.52 per cent of the total wheat crop was produced in four states, containing only 5.84 per cent of the entire land surface of the country. In 1889 those same states produced only 15.66 per cent of the total, while four others, containing 11.01 per cent of the entire land surface, produced 35.85 per cent of the total crop.

The cultivation of oats was centralized to so great an extent in 1839 that 56.20 per cent of the total oat crop of the country was the production of four states. Succeeding decennial censuses have found various changes in the area of principal production, until the states that formerly stood at the head of the list have come to make relatively small con-

tributions to the total. At no census, however, has less than 45.41 per cent had to be credited to what were for the time being the four leading oat-producing states. Between 1879 and 1889 the production of oats almost doubled and the enormous increase in the acreage was more generally distributed over the country at large than was the increase in the acreage devoted to any other important product, even the southern states having a net increase amounting to 705,869 acres. Nevertheless the percentage of the total crop of the country grown in the four states of largest production was even greater in 1889 than in 1879.

Rye has never been a favorite crop in the United States, and there have been times when its cultivation has shown a marked decline. In fact, its production increased only 52.43 per cent during the fifty years, 1840 to 1890, in which population increased 266.87 per cent. It is no wonder, therefore, that, notwithstanding its hardiness as a plant, its cultivation is very unequally distributed, even within the climatic range to which it normally belongs. The interesting fact, however, remains that whatever may have been the fluctuations of its production, a considerable proportion of the total crop of the country has always been contributed by some two or three states. In 1839, 1849, 1859, and 1869 the states of New York and Pennsylvania produced 51.45, 63.10, 48.63, and 35.79 per cent of the total crops of those years. In 1879 Illinois had displaced New York, and two other western states, Wisconsin and Iowa, were coming into prominence as rye-producing states. Still there was no less marked a concentration of the area of production, the two leading states producing 34.31 per cent and the three next in rank 32.53 per cent of the total crop. The census of 1890 disclosed some tendency toward decentralization in the cultivation of this product. But while Wisconsin stood at the head of the

list with 14.96 per cent of the total crop, the old rye-producing states of New York and Pennsylvania stood second and third, respectively, with a combined production amounting to 23.96 per cent of the total.

While the total production of buckwheat in the United States is inconsiderable, it is contributed to, to a greater or less extent, by every state in the Union except Louisiana and Nevada, and every territory except Arizona and Oklahoma. At six successive decennial censuses, however, over 60 per cent of the total production has been grown in New York and Pennsylvania, there being a difference of only 0.52 per cent in the proportion contributed by those states when the total crop of the country was 17,571,818 bushels and when it was only 7,291,743 bushels.

It is, however, in the distribution of the area under barley that we encounter the greatest anomalies, so far as the cereals are concerned. This grain has an exceedingly wide climatic range, its limit of successful cultivation extending farther north than that of any other cereal, while it can also be profitably grown in sub-tropical regions. It is cultivated with great success in Arizona, and at the Tenth Census a larger proportion of the total barley crop of the country was found to have been grown where the annual rainfall was less than 15 inches than of the total crop of any other cereal. Notwithstanding all this, however, barley has always been distinguished for the density of its area of principal production. In 1839 the state of New York produced 60.56 per cent of the total crop of the country, or over seven times as much as was produced by any other state. In 1849 the production of New York had increased to 69.38 per cent of the total, or more than ten times that of any other state. In 1859 California had come to the front, contributing 27.90 per cent of the total production, as compared with 26.45 per cent

produced in New York. Ten years more and the same two states, so utterly dissimilar both in their physical conditions and their methods of cultivation, were producing 54.49 per cent of the total, a proportion, however, that was reduced to 46.04 per cent during the decade ending with 1879. Among the many remarkable changes disclosed by the census of 1890 is the very large increase in the cultivation of barley, the increase in acreage between 1879 and 1889 amounting to 61.23 per cent and the increase in production to 78.04 per cent. Still, two states were producing 41.84 per cent and two others 28.73 per cent of the total crop of the country, New York producing over sixteen times as much as the adjoining state of Pennsylvania, of almost equal area and with very similar agricultural conditions.

There are few agricultural products that more readily accommodate themselves to varying conditions of soil and climate than does tobacco. In India it is grown in almost every district, while in Europe its cultivation extends from Sicily to Sweden. In 1839 its production in the United States was contributed to by every state and territory, and in 1889 there were but six out of the greatly increased number of political divisions that did not make some contribution to the tobacco crop of the country. Nevertheless 53.76 per cent of the crop of 1839 and 55.38 per cent of the crop of 1889 (the latter reaching the large total of 488,256,646 pounds) were produced in the states of Kentucky and Virginia. While the production of the four leading tobacco-growing states has fallen from 83.57 per cent of the total in 1839 to 70.58 per cent of the total in 1889, the proportion borne by the crop of Kentucky has gradually increased from 24.90 per cent in 1859 to 45.44 per cent in 1889.

The cultivation of flax is one of the curiosities of American agriculture. It has passed through extraordinary vicissitudes,

flax having at one time been grown chiefly for its fiber, and at another almost entirely for its seed. It has always, however, been noted for the vagaries of its geographical distribution. It was not until 1850 that flax and hemp were separately reported in the census statistics, but at that time flax was being grown, to a greater or less extent, in every state of the Union with the exception of Louisiana and in every territory except Minnesota. Three states, however, produced 57.38 per cent of the total seed crop and three 52.42 per cent of the total amount of fiber, Ohio producing two and one-half times as much seed and Kentucky more than twice as much fiber as any other state. We need not follow this product through the changing circumstances of its eventful history. It is, however, worthy of note that of the production of fiber in 1869, which was to the production in 1889 as 112 to 1, 65.95 per cent was produced in Ohio. Ten years later and the relative production of flaxseed and fiber was practically reversed, and yet the geographical concentration of both branches of the industry was no less marked than before. In 1889 it was still further intensified, four northwestern states producing 84.66 per cent of the total flaxseed crop of the country. The production of fiber has shrunk to very small proportions, and a similar concentration characterizes it. In 1889 Illinois raised 23.93 per cent of the total fiber production of the country, and 99.35 per cent of the crop of the state was produced in three counties. Kansas contributed 14.95 per cent of the total, and 93.16 per cent of its entire production was derived from two counties.

Hemp is a product that is cultivated in Europe from the shores of the White Sea to those of the Mediterranean, France producing three, Austria-Hungary six, Italy nearly seven and Russia over ten tons for every ton produced in the United States. It also flourishes throughout extensive regions

in Asia, Africa and South America. Its cultivation in the United States, however, is almost entirely confined to the state of Kentucky, notwithstanding that the annual production falls considerably short of the requirements of the country. In 1849 51.01 per cent of the total hemp crop of the country was grown in that state. In 1889 Kentucky's contribution to the total was no less than 93.77 per cent, its proportion having steadily increased, regardless of the fluctuations in the total amount produced. Moreover, not only is the industry centralized in a single state, but it is concentrated in a very small group of counties, four of them producing 59.48 per cent and six others 31.94 per cent of the total crop of the country. There is, therefore, but 8.58 per cent of the entire crop grown in the remaining twenty-four hemp-producing counties of the eight hemp-producing states.

The range of profitable cultivation in the case of the hop plant, though less extensive than that of most of the other products to which reference has been made, is still sufficiently wide to make the situation of its areas of principal production in this country a matter of interest in this connection. Beginning, as in the case of the other products, with the first census of agriculture ever taken in the United States, that of 1840, it is found that of the total production of hops in 1839, amounting to 1,238,502 pounds, 36.11 per cent was produced in New York and 40.23 per cent in Massachusetts and New Hampshire. Forty years later, when the hop production of the country had increased to 26,546,378 pounds, that of New York had increased in so much greater a ratio as to amount to 81.48 per cent of the total. The states that had stood second and third in rank of production in 1839 were scarcely known as hop-producing states, Wisconsin in the northwest and California and Washington on the Pacific

coast having far outranked them. Ten years more and the industry was almost revolutionized. While New York still contained 73.03 per cent of the total hop acreage, its production amounted to only 51.22 per cent of the total yield, owing to the remarkable growth of the industry on the Pacific coast, where 24.33 per cent of the hop acreage of the country yielded 47.16 per cent of the total production. The yield per acre on the Pacific coast being nearly three times as great as it is in the state of New York, the next census will probably find the hop production of the country scarcely less concentrated than in the past, but concentrated not in the state that has so long dominated the industry, but 3,000 miles farther west.

Now, however convenient it might be to do so, we cannot dismiss these inequalities of distribution with the simple assertion that they represent the experience and judgment of the American farmer as to the balance of advantage accruing from differences in temperature, in rainfall, in the chemical composition and mechanical structure of soils, in facility of cultivation, in cheapness of labor, in proximity to markets, in convenience of transportation, and other considerations that affect, in varying measure, the cultivation of crops; in other words, that they are wholly the result of the operation of the law of the survival of the fittest.

While it would be absurd to deny that, at least in the case of corn, wheat, and oats, the areas of principal production are peculiarly adapted to the successful cultivation of those products, the geographical distribution even of those leading cereals as it exists to-day is in no small degree the result of circumstances that are entirely distinct from any considerations of the superiority of soil and climate and that cannot be depended upon to maintain the situation they have so largely contributed to bring about.

That tide of population which has been gradually rolling westward has brought one state after another under the dominion of the plow, each being largely devoted, in turn, to the cultivation of a very limited number of products, selected with regard to facility of cultivation and the promise of a speedy return. Reaching the central Mississippi valley that tide of population—the simile is both apt and convenient—spread itself out over a wide expanse of country, the soil of which, if not more fertile than that of the Eastern States, was at least more uniformly susceptible of cultivation. Here under those generous conditions of the United States land laws which made the land practically a free gift 100,000,000 acres and more were within a very few years converted into farms, and upon those farms the leading cereals have been cultivated on a scale of unexampled magnitude and with an unprecedented geographical concentration. To such an extent has that concentration been carried in certain portions of that remarkable region that in 1889 the state of Illinois had no less than 39 per cent of its entire land surface devoted to the cultivation of corn, wheat and oats, notwithstanding the large number of its towns and cities, including Chicago, its 10,116 miles of railroad, its thousands of miles of public highways, and that tendency toward a greater diversification which even at that time had had a marked effect upon the agriculture of the state.

The center of cereal production, however, has always been in advance of the center of population, and as surely as that branch of industry has succeeded the pastoral, so surely has it been, itself, gradually supplanted by that more diversified system of farming which has been rendered necessary by the requirements of a population increasing not merely in numbers, but also in the multiplicity of its wants. Hence, while some of the older agricultural states have, until within the

last few years, gone on increasing, little by little, their production of the principal cereals, as the total area of their land in farms and likewise that of their improved land have slowly increased, every year has witnessed a greater diversification of their agricultural industry, so that even their increasing production of grain has constituted a decreasing proportion of their entire farming operations. In course of time, however, even this limited increase, insufficient to keep pace with the growth of population, has come to an end, and the Eleventh Census finds a more or less considerable decrease in the total acreage devoted to the cultivation of cereals, not merely in the New England states, where it excites but little surprise, but also in New York, New Jersey, Pennsylvania, Ohio, and Illinois. Nor is this wholly the result of that curtailment of the area under wheat to which reference will presently be made. Even in Illinois, long the greatest cereal-producing state in the Union, oats are the only cereal not showing a reduction in acreage, while the curtailment of the area under corn amounts to no less than 1,156,256 acres.

It may, of course, be contended that these are but temporary fluctuations, at least in such a state as Illinois, and every one knows that let the agriculture of a country be ever so stable it cannot but be affected by the rise and fall of prices, by a succession of unfavorable seasons, or by the ravages of disease or insect enemies. But when there is already a marked tendency toward a system of farming which, though it may occasionally diminish the profits, can always be depended upon to lessen the risks—a consideration of no small moment in such an industry as agriculture—any especially adverse conditions that may arise will only serve to give it additional force.

Moreover, this tendency is by no means confined to the

older-settled states, but is, on the contrary, growing steadily even in the newer regions west of the Mississippi river. Eight years ago I watched its beginnings in Minnesota and Dakota, and in a series of letters on the agriculture of those states, which were given a somewhat extensive circulation by the management of one of the railroads of that region, I took occasion to urge upon the northwestern farmer the advantage to be derived from a greater diversification of his industry. How far those recommendations, taken up and reinforced as they were by leading agriculturists, contributed to bring about the change that has since taken place will never be known, but not only did the census of 1890 find in Minnesota an astonishing development of the livestock and dairy industries, but the large area of 6,297,044 acres devoted to the cultivation of corn, wheat, oats, barley, rye, and buckwheat in that state was found to be more evenly distributed among those different cereals than was the cereal acreage of any other state in the Union. It is only a few years since in the great wheat belt of North Dakota it was impossible to procure butter, cheese, eggs or fruit that had not been brought hundreds of miles from some leading produce market or some agricultural district that was not so completely given up to a single branch of the industry. Now, however, all this is changed and mixed farming is in the ascendant. This is equally true of the states west of the Missouri river; indeed, when in 1889 so many parts of the country had a short fruit crop, hundreds of carloads of apples, grown on the but recently treeless plains of Nebraska, were shipped both to New York and San Francisco.

The growing favor with which mixed farming is regarded is not, however, due exclusively to the large and increasing demand for meat, poultry, eggs, milk, butter, cheese, vegetables and fruits of all kinds and a variety of other products,

nor yet to any general recognition on the part of the farmer of the unmistakable advantages accruing from a diversified agriculture. The era of low prices through which the country has been passing and the enormous shrinkage in our exports of grain have done much to stimulate it. Until recently the rapid numerical increase and growing prosperity of our own population, added to the apparently illimitable capacity of foreign countries to absorb our surplus production, have afforded a ready market for even the largest of our crops. But however it may be in the future, there has certainly been a suspension of the conditions that obtained for so many years. Largely as a consequence, there were withdrawn from the cultivation of wheat in thirty-five states of the Union, between 1879 and 1889 and doubtless in the closing years of the decade, no fewer than 8,442,308 acres of land, of which 2,403,740 acres were in Iowa, 1,204,080 acres in Wisconsin and 977,610 acres in Illinois, the whole constituting an area nearly three and one-half times as great as the total wheat acreage of the United Kingdom. Imagine the effect of such an element of disturbance upon the general order of crop distribution! Is it any wonder that the farmer should have recourse to a system of agriculture that will to a large extent relieve him of the necessity of a continual readjustment of his farming operations to meet possibly temporary fluctuations in the demand for particular products?

Immeasurably the most important of recent events, in its bearing upon American agriculture, is the practical exhaustion of the public domain. While there are still millions of acres of land inclosed in farms, but not yet brought under cultivation, no such addition is likely again to be made to the cereal acreage of the country as has been witnessed almost annually for many years past.

One inevitable result of this fact, taken in conjunction with

the steady increase of population, will be the gradual equalization of the cost of production. This will certainly tend toward decentralization. The necessity of a more considerate treatment of the soil, which will force itself, little by little, upon the attention of the western farmer, will probably have a similar tendency. The establishment of state agricultural experiment stations and their liberal subsidization by the national government is another step in the same direction, while the extension of manufactures will, even independently of the growth of population, contribute materially to the same result.

There is no question that the production of barley in the west has been greatly stimulated by the increase in the brewing industry in Chicago, Milwaukee, St. Louis, and other cities, that industry having now attained such magnitude that in the three cities I have mentioned the consumption of barley exceeds even that of wheat. I am not sure that it is not to the astonishingly high rate at which the domestic demand for barley has kept on increasing that the continued failure of the American farmer to grow a sufficient quantity of that grain to meet the demands of the home market is largely attributable, for while in the fifty years ending with 1890 the percentage of increase in the production of barley in this country was six times as great as that of the increase of population, the percentage of increase in the consumption of malt liquors was more than twice as great as that of the production of barley.

In arriving at the conclusion that the United States has witnessed the greatest geographical concentration in the cultivation of its various agricultural products that it is likely to see, and that while nothing like an equal geographical distribution of the areas devoted to particular products is to be expected or even desired, yet that henceforward there will

be a decided tendency toward decentralization, I have endeavored not to underestimate the forces that may run counter to such a result. I appreciate the importance to the farmer of his cultivating at least one product that is readily convertible into money, but I fail to see that, taking one year with another, a well-devised system of mixed farming will not yield quite as speedy a return upon capital invested and labor expended as the proportionately more extensive cultivation of one or two products. I make allowance for such influences as may be exerted in the interest of the established channels of trade, but when the farmers of thirty-five states cut down their production of wheat to the extent of 100,000,000 bushels per annum, they gave no thought either to empty elevators or idle freight cars. I recognize the fact that while everything must have a beginning, the sporadic cultivation of a product for which there is no local demand is rarely profitable, but it is no unwarrantable excursion into the realm of speculation to say that with the growth of population and the extension of manufactures there will spring up new markets for every product that can be grown on United States soil. I realize, moreover, that there are many important products in the cultivation of which a farmer would hesitate to engage without some practical knowledge of their growth and preparation for market. For every farmer, for example, who has had experience in the growing of tobacco there are twenty-five who understand the cultivation of the cereals and the management of cattle, while there are many products with regard to which the disproportion is still greater.

The American farmer, however, is as migratory as he is progressive. There is scarcely an important county in the west that has not drawn upon the agricultural population of every state outside the cotton belt, and it certainly took the

people of Washington but a very short time to place their state in the front rank of the hop-producing states of the Union after it was discovered that the volcanic soil of the western slopes of the Cascades was well adapted to the cultivation of that product.

But just as the household manufacture of linen still lingers in western Virginia, where, under the shadow of the Cumberland mountains, many families still weave their own bed and table linen from the product of their own fields, so, in all probability, will there continue to be certain localities given up largely to the cultivation of particular products, not only without the possession of any especial advantages for such cultivation, but even to the positive disadvantage of those engaged in the industry, and certainly altogether out of accord with the enlightenment and progress of the age.

